REMARKS

In the Office Action of June 8, 2007, claims 1-14, 16-24 and 27-29 were rejected and claims 15, 25 and 26 were objected to. In addition, the drawings were objected to by the Examiner. Drawings drafted by an outside draftsmen have been included in this amendment. Applicant respectfully requests that this rejection be withdrawn.

Claim Objections

Claim 1 was objected to for insufficient antecedent basis in a limitation of the claim. Claim 1 has been amended to cure this objection.

Claim Rejections under 35 U.S.C. § 103(a)

Claims 1-7, 9-10, 12-14, 16-18, 20-24 and 27-29 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,196,709 to Berndt et al. (hereinafter referred to as "Berndt") in view of U.S. Patent Application No. 2003/0067607 to Wolleschensky et al. (hereinafter referred to as "Wolleschensky"). Applicant respectfully traverses this rejection.

Berndt generally discloses a method and apparatus for detecting the change in phase angle and/or modulation of emitted fluorescence of a fluorophore excited by modulated light from a laser diode, wherein the light is monochromatic and coherent and can contain harmonic frequency components.

Berndt fails to teach, suggest or disclose several elements of claims 1, 16 and 20. For example, contrary to the Examiner's suggestions, Berndt, in col. 9, lines 14-34 and everywhere else in the disclosure, fails to teach or suggest *generating a plurality of heterodyne frequencies*, each of *the heterodyne frequencies* being associated with one of the modulation frequencies, *generating a plurality of heterodyne frequencies* to form a set of heterodyne signals at the heterodyne frequencies, each of the heterodyne frequencies being associated with one of the modulation frequencies, coupling the modulation frequencies to

the excitation source, causing the excitation source to generate excitation energy modulated in intensity in proportion to the modulation frequencies.

Berndt does not teach or suggest or even mention a heterodyne frequency at all. In addition, the cited disclosure, col. 9, lines 14-34, appears to only teach a laser light source that may be intrinsically modulated at a desired frequency. A sample, positioned close to the laser source, captures excitation light. And the diode laser (light source) generates an electric trigger output via a first frequency synthesizer 5a, which is synchronized with a second frequency synthesizer 5b. Applicant respectfully submits that nowhere in the referenced cited portion does Berndt teach the elements of the claim that the Examiner suggests. Applicant respectfully requests that the Examiner specifically point out where in Berndt such disclosure may be found.

The Examiner further submits that the claimed "sampling a portion of the excitation energy to form a reference excitation signal" is found in Berndt, col. 10, lines 7-31. Applicant respectfully disagrees and hereby submits that in that referenced portion, Berndt does not teach sampling of any kind, let alone sampling an excitation energy to form a reference excitation signal, as claimed in claims 1, 16 and 20. In fact, the referenced portion of Berndt teaches a phase meter, and a pulsed laser diode with harmonic content. Also, a laser diode with a trigger output, wherein any drift of the trigger output signal is transferred to a third frequency synthesizer.

Further, while the Examiner submits that the claimed multielement detector is taught in Berndt, in col. 9, lines 35-58, contrary to the Examiner's suggestions, col. 9, lines 35-58 of Berndt teach a microchannel plate (MCP) photo-multiplier (PMT) 6, that measures scattered radiation from the diode laser 3. Berndt fails to teach or suggest a multielement detector, or associated each measurement signal associated with a single of the elements.

In addition, the Examiner admits that Berndt "remains silent regarding focusing the output signal as an image modulated with the plurality of modulated frequencies on an image intensifier." *See* Office Action, page 4, lines 16-17. However, the Examiner incorrectly

asserted that Wolleschensky cured the deficiencies of Berndt by teaching "a similar spectrographic measurement system that includes focusing optics (AO) to focus an output signal as an image modulated with the plurality of modulated frequencies on an image intensifier (page 3, paragraph 0044)." *See* Office Action, page 4, lines 18-20.

Contrary to the Examiner's suggestions, paragraph 44 of Wolleschensky teaches that in descanned detection, pinhole optics are focused on a detector through a pinhole, which suppresses scattered light and light from outside of the confocal focus. Thus, even if, assuming arguendo, a person having ordinary skill in the art would have been motivated to combine Berndt with Wolleschensky, as suggested in the Office Action, the combination would not have resulted in Applicants' presently claimed invention. That is, if one were to combine the descanned detection, as taught by Wolleschensky, with the apparatus of Berndt, as suggested in the Office Action, the resulting device would nonetheless be different than the methods and apparatus of claims 1, 16 and 20, because the resulting methods or apparatus would not have any generation or use of heterodyne frequencies, any sampling of excitation energy, or focusing an output signal, among other things.

Because of the above distinctions, there is clearly no teaching or suggestion in Berndt or Wolleschensky which would have motivated the ordinary artisan to modify Berndt in such a manner as to result in or otherwise render obvious the inventions of claims 1, 16 and 20. Therefore, claims 1, 16 and 20 are patentably distinguishable from Berndt and Wolleschensky and are in condition for allowance. Applicant respectfully requests that these rejections be withdrawn.

Berndt fails to teach or suggest several of the elements of claim 17, including, for example, generating heterodyne frequencies, as claimed in claim 17. As mentioned above, Berndt fails to teach or suggest a heterodyne frequency at all, let alone generating such frequency or associating such frequencies.

In addition, the cited disclosure, col. 9, lines 14-34, only teaches a laser light source that can be intrinsically modulated at a desired frequency. A sample, positioned close to the

laser source, captures excitation light. And the diode laser (light source) generates an electric trigger output via a first frequency synthesizer 5a, which is synchronized with a second frequency synthesizer 5b. Applicant respectfully submits that nowhere in the referenced cited portion does Berndt teach the elements of the claim that the Examiner suggests. Similar to the arguments mentioned above, Berndt fails to teach or suggest so many of the elements of claim 17, that Applicant hereby respectfully requests that the Examiner submit more details of where such disclosure is allegedly taught in Berndt.

The Examiner admitted that "Berndt remains silent regarding an optical member for diverting a portion of the laser." *See* Office Action, page 6, lines 13-14. However, the Examiner asserted that Wolleschensky "discloses (fig. 5) a similar spectrographic measurement system that includes an optical member (BS1) to divert a portion of the laser to generate a reference signal (page 3, paragraph 41)." *See* Office Action, page 6, lines 14-16. The referenced portion of Wolleschensky simply teaches a light source, such as a short pulse laser, that is divided into two partial beams. There is no suggestion or disclosure of the splitting of the beam to create a reference signal. Therefore, even if, assuming arguendo, a person having ordinary skill in the art would have been motivated to combine Berndt with Wolleschensky, as suggested in the Office Action, the combination would not have resulted in Applicants' presently claimed invention. That is, if one were to combine the optical modulator, as taught by Wolleschensky, with the apparatus of Berndt, as suggested in the Office Action, the resulting device would nonetheless be different than the apparatus of claim 17, because the resulting apparatus would not have any generation or use of heterodyne frequencies or any sampling of excitation energy, among other things.

Because of the above distinctions, there is clearly no teaching or suggestion in Berndt or Wolleschensky which would have motivated the ordinary artisan to modify Berndt in such a manner as to result in or otherwise render obvious the invention of claim 17. Therefore, claim 17 is patentably distinguishable from Berndt and Wolleschensky and is in condition for allowance. Applicant respectfully requests that this rejection be withdrawn.

Berndt fails to teach, suggest or disclose several elements of claim 24. For example, contrary to the Examiner's suggestions, Berndt, in col. 9, lines 14-34 and everywhere else in the disclosure, fails to teach or suggest generating a plurality of heterodyne frequencies, each of the heterodyne frequencies being associated with one of the modulation frequencies; generating a plurality of heterodyne frequencies to form a set of heterodyne signals at the heterodyne frequencies, each of the heterodyne frequencies being associated with one of the modulation frequencies, coupling the modulation frequencies to the excitation source, causing the excitation source to generate excitation energy modulated in intensity in proportion to the modulation frequencies. In fact, Berndt does not teach or suggest or even mention a heterodyne frequency at all. In addition, the cited disclosure, col. 9, lines 14-34 only teaches a laser light source that can be intrinsically modulated at a desired frequency. A sample, positioned close to the laser source, captures excitation light. And the diode laser (light source) generates an electric trigger output via a first frequency synthesizer 5a, which is synchronized with a second frequency synthesizer 5b. Applicant respectfully submits that nowhere in the referenced cited portion does Berndt teach the elements of the claim that the Examiner suggests. Applicant respectfully requests that the Examiner specifically point out where in Berndt such disclosure may be found.

The Examiner further submits that the claimed "sampling a portion of the excitation energy to form a reference excitation signal" is found in Berndt, col. 10, lines 7-31. Applicant respectfully disagrees and hereby submits that in that referenced portion, Berndt does not teach sampling of any kind, let alone sampling an excitation energy to form a reference excitation signal, as claimed in claim 24. In fact, the referenced portion of Berndt teaches a phase meter, and a pulsed laser diode with harmonic content. Also, a laser diode with a trigger output, wherein any drift of the trigger output signal is transferred to a third frequency synthesizer.

Further, the Examiner submits that the claimed "generating a plurality of measurement signals using the multielement detector, each measurement signal associated with a single one of the elements, for each measurement signal associated with a single one of the elements of the multielement optical detector" is taught in Berndt, in col. 9, lines 35-

58. Contrary to the Examiner's suggestions, col. 9, lines 35-58 of Berndt teach a microchannel plate (MCP) photo-multiplier (PMT) 6, that measures scattered radiation from the diode laser 3. Berndt fails to teach or suggest a multielement detector, or associated each measurement signal associated with a single of the elements. PMT 6 is not the same as a multielement detector, as suggested by the Examiner.

In addition, the Examiner admits that Berndt "remains silent regarding focusing the output signal as an image modulated with the plurality of modulated frequencies on an image intensifier." *See* Office Action, page 4, lines 16-17. However, the Examiner incorrectly asserted that Wolleschensky cured the deficiencies of Berndt by teaching "a similar spectrographic measurement system that includes focusing optics (AO) to focus an output signal as an image modulated with the plurality of modulated frequencies on an image intensifier (page 3, paragraph 0044)." *See* Office Action, page 4, lines 18-20.

Contrary to the Examiner's suggestions, paragraph 44 of Wolleschensky teaches that in descanned detection, pinhole optics are focused on a detector through a pinhole, which suppresses scattered light and light from outside of the confocal focus. Thus, even if, assuming arguendo, a person having ordinary skill in the art would have been motivated to combine Berndt with Wolleschensky, as suggested in the Office Action, the combination would not have resulted in Applicants' presently claimed invention. That is, if one were to combine the descanned detection, as taught by Wolleschensky, with the apparatus of Berndt, as suggested in the Office Action, the resulting device would nonetheless be different than the apparatus of claim 24, because the resulting methods or apparatus would not have any generation or use of heterodyne frequencies, any sampling of excitation energy, or focusing an output signal, among other things.

Because of the above distinctions, there is clearly no teaching or suggestion in Berndt or Wolleschensky which would have motivated the ordinary artisan to modify Berndt in such a manner as to result in or otherwise render obvious the invention of claim 24. Therefore, claim 24 is patentably distinguishable from Berndt and Wolleschensky and is in condition for allowance. Applicant respectfully requests that this rejection be withdrawn.

Claim 27 recites a method of spectrographic analysis. The method includes generating light modulated by modulation frequencies, generating heterodyne frequencies each associated with one of the modulation frequencies, splitting the light modulated by the modulation frequencies into reference light and measurement light, causing the measurement light to fall on a sample to be assayed and stimulate the production of a measurement light signal, sending the measurement light signal and the heterodyne frequencies to a first mixer, sending the heterodyne frequencies and the reference light to a second mixer, and sending the output of the first and second mixers to a computer for analysis of the sample.

Berndt fails to teach, suggest or disclose several elements of claim 27. For example, contrary to the Examiner's suggestions, Berndt, in col. 9, lines 14-34 and everywhere else in the disclosure, fails to teach or suggest generating a plurality of heterodyne frequencies, each of the heterodyne frequencies being different from its modulation frequencies. In fact, Berndt does not teach, suggest or even mention heterodyne frequency. In addition, the cited disclosure, col. 9, lines 14-34 only teaches a laser light source that can be intrinsically modulated at a desired frequency. A sample, positioned close to the laser source, captures excitation light. And the diode laser (light source) generates an electric trigger output via a first frequency synthesizer 5a, which is synchronized with a second frequency synthesizer 5b. Applicant respectfully submits that nowhere in the referenced cited portion does Berndt teach the elements of the claim that the Examiner suggests. Applicant respectfully requests that the Examiner specifically point out where in Berndt such disclosure may be found.

In addition, the Examiner admitted that "Berndt remains silent regarding splitting the light." *See* Office Action, page 9, line 19. The Examiner further submits that Wolleschensky discloses a similar spectrographic measurement system that includes an optical member (BS1) to divert a portion of the laser to generate a reference signal. The referenced portion of Wolleschensky does teach a light source, such as a short pulse laser, that is divided into two partial beams. However, even if, assuming arguendo, a person having ordinary skill in the art would have been motivated to combine Berndt with Wolleschensky, as suggested in the Office Action, the combination would not have resulted in Applicants' presently claimed

invention. That is, if one were to combine the optical modulator, as taught by Wolleschensky, with the method of Berndt, as suggested in the Office Action, the resulting device would nonetheless be different than the method of claim 27, because the resulting method would not have any generation or use of heterodyne frequencies or any sampling of excitation energy, among other things.

Because of the above distinctions, there is clearly no teaching or suggestion in Berndt or Wolleschensky which would have motivated the ordinary artisan to modify Berndt in such a manner as to result in or otherwise render obvious the invention of claim 27. Therefore, claim 27 is patentably distinguishable from Berndt and Wolleschensky and is in condition for allowance. Applicant respectfully requests that this rejection be withdrawn.

Claims 2-7, 9-10, 12-14, 18, 21-23 and 28-29 are all in condition for allowance based on their dependence from patentably distinct independent claims 1, 16, 17, 20, 24 and 27, respectively, as well as their independent merit.

Claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over Berndt in view of Wolleschensky as applied to claim 1, and in further view of U.S. Patent No. 4,180,328 to Drain (hereinafter referred to as "Drain"). Claim 8 recites the method as in claim 1, wherein excitation source is a laser whose output is modulated by a Pockel's cell. Claim 8 is in condition for allowance based on its dependency from independent claim 1, as well as its own independent merit. Applicant respectfully requests that the Examiner withdraw this rejection.

Claim 11 was rejected under 35 U.S.C. §103(a) as being unpatentable over Berndt in view of Wolleschensky as applied to claim 1, and in further view of U.S. Patent No. 5,981,957 to Cruce et al. (hereinafter referred to as "Cruce"). Claim 11 recites the method as in claim 1, wherein the excitation source is a light emitting diode. Claim 11 is in condition for allowance based on its dependency from independent claim 1, as well as its own independent merit. Applicant respectfully requests that the Examiner withdraw this rejection.

Claim 19 was rejected under 35 U.S.C. §103(a) as being unpatentable over Berndt in view of Wolleschensky as applied to claim 17, and in further view of U.S. Patent Application No. 2003/0043384 to Hill (hereinafter referred to as "Hill"). Claim 19 recites the apparatus as in claim 17, wherein the optical member is a prism. Claim 19 is in condition for allowance based on its dependency from independent claim 17, as well as its own independent merit. Applicant respectfully requests that the Examiner withdraw this rejection.

Allowable Subject Matter

Claims 15, 25 and 26 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Because claims 1 and 24 are in condition for allowance, Applicant has not amended claims 15 and 25-26 to include the limitations of the base claims. However, Applicant reserves the right to amend these claims in a subsequent action to have these claims allowed, for purposes of time.

CONCLUSION

Notwithstanding the issue of finality, it is believed clear that the subject references do not anticipate the subject matter of the invention, as claimed. As detailed in the remarks set forth above, it is respectfully submitted that this application is in condition for allowance. Accordingly, allowance is requested.

If there are any remaining issues, the Examiner is invited to call the applicant's attorney to resolve the same at 212-209-4942.

Authorization is hereby given to charge deposit account 50-0369 in connection with any fees or extension of time or any other fee that may be necessary to permit entry of this response.

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Respectfully submitted,

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